

Appl. No. 09/829,372
Amdt. Dated March 17, 2004
Reply to Office Action of November 17, 2004

REMARKS

Pending Claims:

Claims 10-13, 17, 48-52, and 53 have been amended merely to clarify Applicant's invention. Claims 58-62 have been added. Therefore, claims 10-19 and 48-62 are pending in the application. Applicants submit that the amendments contain no new matter. Support for the amendments can be found throughout the specification, for example in Figure 2, and at page 7, lines 25-30, page 15, lines 14-17, and page 19, lines 3-4. Entry of the Amendment and reconsideration of the claims in view of the following Remarks is respectfully requested.

Linking Claims:

The Examiner has asserted that linking claims are not available, due to cancellation of claims after Restriction. Applicant respectfully disagrees, and points the Examiner to the qualification of the claim cancellation. Applicant's cancellation of claims was "subject to linking claims 28, 29, and 33. On allowance of linking claim 10, the Examiner is reminded that these linking claims must be examined in this case" (Response, page 1).

35 U.S.C. § 112

Claims 10-13 stand rejected under 35 U.S.C. 112 as being indefinite. The Examiner contends that the term "protecting group" is used in a manner that differs from the accepted meaning. Applicants traverse this rejection.

Claims 10-13 are amended to address the Examiner's concerns and to simplify the language of the claim for clarity. As amended, claims 10-13 do not recite the term "protecting group." Rather, these claims now recite "protection units" to clarify that one or more of the protection units are linearly bonded to form a "protection group". Withdrawal of the rejection is therefore requested.

The Examiner also contends that page 5, lines 28-29 to page 6, lines 1-2 of the specification indicates that the term "target group" of claims 10-13 is synonymous with the term "protecting group." Applicants also traverse this aspect of the indefiniteness rejection. Claims 10-13 no longer recite the term "protecting group." Rather, the claims now recite "protection

Appl. No. 09/829,372
Amdt. Dated March 17, 2004
Reply to Office Action of November 17, 2004

units" that are linearly bonded to form "protection groups." When all of the protection units in a protection group have been removed, a functional group is exposed (not attached to a protection group) and can react with a "target group" (page 5, line 24 through page 5, line 2). Therefore, Applicants submit that reading claims 10-13 in light of the specification, the term "target group" is readily understood, and cannot be the same as a "protecting group." Rather, the term "target group" is a group that reacts with an exposed functional group (no attached protection group). Withdrawal of the rejection is therefore respectfully requested.

35 U.S.C. § 102

Claims 10-12, 17, 19, and 48 stand rejected under 35 U.S.C. 102 as being anticipated by *Sundberg et al.* Applicants respectfully traverse this rejection.

Although Applicants do not concede the propriety of this rejection, independent claim 10 has been amended merely to clarify the invention. Claim 10 now recites a "method comprising removing a terminal protection unit from each protection group" of a UCP compound, wherein the UCP comprises "a template comprising two or more functional groups," with "protection groups attached to the two or more functional groups." The protection groups comprise "one or more linearly bonded protection units." A "first protection group contains at least one protection unit," while "at least one other protection group contains more protection units than the first protection group."

The Examiner is directed to Figure 2 for a schematic representation of the claimed invention. Figure 2 depicts protection units (open circles) linearly bonded to form protection groups that are attached to a template (shaded area) via functional groups (X). As is further depicted by the scissors and dashed lines of Figure 2, the method of the claimed invention comprises removing the terminal protection units from each protection group of the template. The removal of the terminal protection units results in the exposure of a functional group or groups that is then reacted with a target group (e.g., R¹ in Figure 2).

The methods of the claimed invention therefore provide a unique way to prepare a compound having different functionality. The methods are "fundamentally based on uniform reactions to remove the protection groups," such that "the requirement of reaction compatibility with other parts of a molecule increases linearly with the number of protected functional groups" (page 15, lines 5-9). This method has significant advantages over the traditional orthogonal

Appl. No. 09/829,372
Amdt. Dated March 17, 2004
Reply to Office Action of November 17, 2004

protection methods of the prior art. These prior art methods generally "require a set of completely independent protection groups, so that each protection group can be removed in any order, and in the presence of all other protection groups or functionality" (page 1, lines 19-20). Consequently, the reaction compatibility requirements increase quadratically with the number of protected functional groups (page 15, lines 9-11).

Applicants respectfully submit that *Sundberg et al.* do not disclose consecutively removing linearly bonded protection units (as defined by the claims and depicted in Figure 2) from protection groups. Rather, *Sundberg et al.* teach the derivatization of solid supports and "methods for their preparation, which are useful in the preparation of peptides, oligonucleotides or other small organic molecules" (column 1, lines 64-67). The derivatization comprises reacting a solid substrate "with a derivatization reagent having a substrate attaching group on one end and a reactive site on a distal end" (column 10, lines 57-61). The resulting derivatized substrate "is then contacted with a mixture of linking molecules and diluent molecules. The linking molecules each have reactive groups which are capable of covalent attachment to the reactive sites on the derivatized substrate. The linking molecules additionally have a functional group which is optionally protected" (lines 61-67). This functional group of the linking molecule then serves "as a synthesis initiation site" for the synthesis of various oligomers (column 12, lines 13-16).

Sundberg et al. teach removing protection groups such as dimethoxybenzoin, NVOC, or MeNPOC (column 4, lines 15-20). Applicants submit that these protection groups are not comprised of linearly bonded protection units that are consecutively removed, as is recited by the present claims.

The method of *Sundberg et al.*, therefore, does not have the advantages of the UniChemo Protection Scheme as claimed, wherein the requirement of reaction compatibility with other parts of a molecule increases linearly with the number of protected functional groups. Applicant submits that claim 10 is patentable over *Sundberg et al.* at least for the foregoing reasons. Since claims 11-12, 17, 19, 48, and 50 each depend from, and add additional limitations to, claim 10, these claims are also patentable over *Sundberg et al.* Withdrawal of the rejection is therefore respectfully requested.

Claims 10-12, 14, and 53 stand rejected under 35 U.S.C. 102 as being anticipated by *Tomalia et al.* The Examiner asserts that the reference discloses a cascade reaction method for

Appl. No. 09/829,372
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the unimolecular assemblage of a dendrimer (target compound) comprising an initiator core (template), interior layers composed of repeating units (target group), and an exterior surface of terminal functionality (functional group) having protecting groups. Applicants respectfully traverse this rejection.

Applicants submit that *Tomalia et al.* does not anticipate the instant claims for the same reason as discussed above with respect to *Sundberg et al.* Namely, *Tomalia et al.* do not disclose consecutively removing linearly bonded protection units from protection groups. Rather, *Tomalia et al.* is directed to dendritic polymer conjugates "composed of at least one dendrimer in association with at least one unit of a carried material" (Abstract). The dendrimer conjugates are comprised of interior layers ("generations") of repeating units of the dendrimer and an exterior surface attached to the outermost generation, the exterior surface having functionality (column 11, lines 45-51). The functionality comprises a single protecting group that is removed to allow reaction with another repeated dendrimer unit (column 13, lines 21-35).

Tomalia et al. do not, however, teach or suggest protection groups comprising linearly bonded protection units, let alone consecutively removing such linearly bonded protection units from the protection groups as recited by the present claims. *Tomalia et al.* discloses protection groups including carbamates such as 9-fluorenylmethylcarbamate, and phthalimides (column 25, line 33 through column 26, line 30). These protection groups are standard protection groups known in the art, and do not comprise linearly bonded protection units that are consecutively removed. Applicants submit, therefore, that claim 10 is patentable over *Tomalia et al.* at least for these reasons. Since claims 11-12, 14, and 53 each depend from, and add additional limitations to, claim 10, these claims are also patentable over *Tomalia et al.* Withdrawal of this rejection is therefore respectfully requested.

Claims 10-12, 14, and 53 stand rejected under 35 U.S.C. 102 as being anticipated by *Newkome et al.* The Examiner asserts that this reference teaches a method of dendrimerizing a mixture of branched monomers (target group) on a substrate (template). The Examiner further asserts that the substrate surface comprises protected functionalities. Applicants respectfully traverse this rejection.

As stated above, independent claim 10 recites consecutively removing linearly bonded protection units from protection groups. Applicants submit that *Newkome et al.* do not disclose or suggest a method having this limitation. Rather, *Newkome et al.* is directed to "a method of

Appl. No. 09/829,372
Amdt. Dated March 17, 2004
Reply to Office Action of November 17, 2004

forming a surface layer on a substrate by dendrimerizing a mixture of branched monomers on the substrate wherein the monomers have heterogenously functionalized branches and homogenous connectivity to the substrate" (column 2, lines 33-38). The functionalized branches have a mixture of protected functionalities (column 4, lines 64-66). The reference discloses the use of standard protection groups such as a nitrile, an acetate, and a trisert-butyl ester (column 5, line 50 through column 6 line 34).

None of these protection groups are comprised of "one or more linearly bonded protection units" that are consecutively removed, as recited in claim 10. Applicants respectfully submit, therefore, that claim 10 is patentable over *Newkome et al* for at least this reason. Since claims 11-12, 14, and 53 each depend from, and add additional limitations to, claim 10, these claims are also patentable over *Newkome et al*. Withdrawal of this rejection is therefore respectfully requested.

35 U.S.C. § 103

Claims 10-12, 14, 17, 19, 48, 50, and 53 stand rejected under 35 U.S.C. 103(a) as unpatentable over *Tomalia et al.* and *Shchepinov et al.* Applicant respectfully traverses this rejection.

As discussed above with respect to the 35 U.S.C. § 102 argument, *Tomalia et al.* do not teach or suggest consecutively removing linearly bonded protection units from protection groups as recited by claim 10. *Shchepinov et al.* does not remedy this deficiency. Therefore, neither *Tomalia et al.* nor *Shchepinov et al.*, alone or in combination, teach or suggest all limitations of claim 10 or its dependent claims 11-12, 14, 17, 19, 48, 50, or 53. Withdrawal of the rejection is respectfully requested.

Claims 10-12, 14, 17, 19, 48, 50, and 53 stand rejected under 35 U.S.C. 103(a) as unpatentable over *Newkome et al.* and *Shchepinov et al.* Applicants respectfully traverse this rejection.

As discussed above with respect to the 35 U.S.C. § 102 argument, *Newkome et al.* do not teach or suggest consecutively removing linearly bonded protection units from protection groups as recited by claim 10. *Shchepinov et al.* does not remedy this deficiency. Therefore, neither *Newkome et al.* nor *Shchepinov et al.*, alone or in combination, teach or suggest all limitations of

Appl. No. 09/829,372
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claim 10 or its dependent claims 11-12, 14, 17, 19, 48, 50, or 53. Withdrawal of the rejection is respectfully requested.

Summary

Applicants submit that the claims are in condition for allowance and notification to that effect is earnestly solicited. The Examiner is invited to contact Applicants' representative if prosecution may be assisted thereby.

Respectfully submitted,

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